

**REMARKS**

This submission is made in response to the Non-Final Office Action dated April 17, 2006. Claims 1-27 are currently pending for examination, of which claims 1, 14 and 27 are independent; the remaining claims are dependent claims. In response Applicants have filed herewith an Amendment amending independent claims 1, 14 and 27.

Applicants and the undersigned are most grateful for the time and effort accorded the instant application by the Examiner. The Examiner is respectfully requested to reconsider the rejections presented in the outstanding Office Action in light of the foregoing amendments and following remarks. Applicants intend no change in the scope of the claims by the changes made by this amendment. It should be noted these amendments are not in acquiescence of the Office's position on allowability of the claims, but merely to expedite prosecution.

**Rejection of claims 1-27 under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph:**

Claims 1-27 stand rejected under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph for failing to particularly point out and distinctly claim which Applicants regard as the invention.

Claims 1, 14 and 27 stand rejected under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph for use of the claim terminology "the model being resolved hierarchially (sic) into at least one frame comprising a plurality levels of phonetic detail of varying resolution for each frame." The Examiner considers this terminology to be vague because the terms "at least one frame" and "each frame" conflict, presumably in that the former indicates there can be only one frame and the latter indicates that there must be a plurality of frames.

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Claims 1, 14 and 27 have been amended to delete claim terminology of "for each frame." Applicants respectfully submit that claims 1, 14 and 27, as amended, particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Applicants respectfully request that the Examiner withdraw the rejection of claims 1, 14 and 27 under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph.

The other claims stand rejected for the above reasons because they inherit the claim limitations of the independent claims. Applicants respectfully submit that these claims particularly point out and distinctly claim the subject matter that Applicants regard as the invention for the reasons stated above. Applicants respectfully request that the Examiner withdraw the rejection of these claims under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph.

Claim 1, 14 and 27 have also been amended to correct a minor error in the spelling of "hierarchically." Applicants note that the present amendments to claims 1, 14 and 27 are made to address the Examiner's rejections under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph and to correct minor typographical errors and not to overcome any cited prior art.

**Rejection of claims 1-3, 6-12, 14-16, 19-25 and 27 under 35 U.S.C. § 103(a) over Goldenthal ('424) in view of Newman ('654):**

Claims 1-3, 6-12, 14-16, 19-25 and 27 stand rejected as being unpatentable over U.S. Patent 6,205,424 to Goldenthal et al. (hereinafter Goldenthal ('424)) in view of U.S. Patent 5,946,654 to Newman et al. (hereinafter Newman ('654)) under 35 U.S.C. § 103(a).

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Broadly, as best understood Goldenthal ('424) appears to teach a two-staged cohort selection for speaker verification system having training and verification stages. In the training

stage training speech is recited into the system, converted into a digital signal which is then converted into a temporal sequence of observation frames to create speaker model. The speaker model and a number of cohort models are then stored on a database.

During the verification stage a speech signal is recited into the system and broken down into a sequence of observation frames. This sequence is then compared against the speech model generated by the person whose identity is being verified and a plurality of analogous cohort models. A subset of the plurality of cohort models is then selected for scoring along with the speech model. The system then validates the identity claim based upon the scores for the speech model and the most likely cohort models. The more cohort models available to the system, the less likely that an error will occur in verification (Figures 1-3, col. 3 line 40-col. 6 line 4).

Goldenthal ('424) does not teach "providing a model corresponding to a target speaker, the model being resolved hierarchically into at least one frame comprising a plurality of levels of phonetic detail of varying resolution" as is currently claimed in Applicants' independent claim 1.

As best understood, Newman ('654) appears to teach speaker identification using unsupervised speech models wherein a speech model is broken down into individual phonemes. These phonemes are defined as a series of three phoneme nodes. The system then assigns a set of model parameters to each of the phoneme nodes.

During verification a speech signal is broken down into a series of frames. The frames are directly compared against the corresponding phoneme nodes that make up the speech model on the basis of the model parameters assigned to each phoneme node. A comparison score is generated from this comparison between the frames and the model parameters of the phoneme

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nodes of the speech model in order to identify the speaker reciting speech signal into the system (Figures 1-8, col. 3 line 40-col. 7 line 15).

The Examiner asserts that the system of Newman ('654) teaches the hierarchical resolution of model frames into at least one frame having a plurality of levels of phonetic detail of varying resolution. The Examiner further asserts that it would have been obvious to one of ordinary skill in the art to modify the system of Goldenthal ('424) by comparing speech signal frames against the model parameters of phoneme nodes as taught by Newman ('654) for the purpose of increasing efficiency and quality of a recognition system.

Applicant respectfully submits that in order to establish a *prima facie* case of obviousness three criteria must be met. First, there must be some suggestion or motivation to modify a reference or combine reference teachings, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Second, the modification or combination must have some reasonable expectation of success. Third, the prior reference or combined references must teach or suggest all the claim limitations. MPEP § 2143. The teachings of a prior art reference must be considered as a **whole** including those portions that would lead away from the claimed invention. MPEP § 2141.02(VI).

With regards to claim 1, Applicant respectfully submits that the combined teachings of Goldenthal ('424) and Newman ('654) do not teach or suggest all of the claim limitations.

Applicants' independent claim 1 recites that a model is "resolved hierarchically into at

.....least one frame comprising a plurality of levels of phonetic detail of varying resolution."

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Applicants respectfully submit that Newman ('654) does not teach such claimed subject matter as the Examiner asserts.

The system of Newman ('654) operates by generating a speech model from a speaker sample by breaking the sample down into phonemes. Each of these phonemes contains three phoneme nodes. Each phoneme node has a set of model parameters assigned to it that serve to identify the phoneme node. During verification an unidentified speech sample is broken down into a sequence of frames. Each frame is then compared to the model parameters of each of the phonemic nodes.

The Examiner asserts that such a system involves hierarchical resolution of frames into a plurality of levels of phonetic detail of varying resolution. Applicant respectfully disagrees with the Examiner's assessment.

The system of Newman ('654) does not involve **hierarchical resolution** of a model. Newman ('654) merely teaches the **segmentation** of a speech model into a series of phonemes, each of which is represented by three sets of model parameters that correspond to three nodes of the phoneme (col. 6 lines 29-34). When the system compares a speech signal input to the system against this speech model it does so by comparing each frame of the signal against a corresponding set of model parameters for a phoneme node (col. 6 line 66-col. 7 line 2).

A set of model parameters does not represent a **level of phonetic detail** but is merely a model equation that represents a phoneme node (col. 5 lines 33-46).

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The system of Newman ('654) does not compare a speech signal to a speech model at a **plurality of levels of phonetic detail of varying resolution** as the currently claimed method

does. Rather the system of Newman ('654) performs a **segmented** comparison between speech signal frames and sets of model parameters for phoneme nodes. The Examiner's rejection is therefore improper.

For the foregoing reasons, Applicants respectfully submit that claim 1 is allowable over Goldenthal ('424) and Newman ('654). Applicants respectfully request that the Examiner withdraw the rejection of claim 1 as being unpatentable over Goldenthal ('424) in view of Newman ('654) under 35 U.S.C. § 103(a).

With regards to the rejections of claims 14 and 27, these claims both recite apparatus or method limitations that track the subject matter of claim 1. Applicants respectfully submit that these claims are allowable over Goldenthal ('424) and Newman ('654) for at least the same reasons as discussed above with regards to claim 1. Applicants respectfully request that the Examiner withdraw the rejection of the subject matter of claims 14 and 27 as being unpatentable over Goldenthal ('424) in view of Newman ('654) under § 103(a).

With regards to the rejections of claims 2, 3, 6-12, 15, 16 and 19-25, these claims are all dependent upon either independent claim 1 or independent claim 14. Applicants respectfully submit that these claims are allowable over Goldenthal ('424) and Newman ('654) for at least the same reasons as discussed above with regards to claims 1 and 14. Applicants respectfully request that the Examiner withdraw the rejection of the subject matter of these claims as being unpatentable over Goldenthal ('424) in view of Newman ('654) under § 103(a).

Claims 4, 5, 13, 17, 18 and 26 were not rejected by the Examiner on the basis of any prior art. The Applicants will assume that these claims are allowable notwithstanding any issues

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arising under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph, which have been addressed by the current Amendment. Applicants graciously acknowledge the Examiner's indication that claims 4, 5, 13, 17, 18 and 26 contain allowable subject matter.

The "prior art made of record" has been reviewed. Applicants acknowledge that such prior art was not deemed by the Office to be sufficiently relevant to have been applied against the claims of the instant application. To the extent that the Office may apply such prior art against the claims in the future, Applicants will be fully prepared to respond thereto.

In view of the foregoing, it is respectfully submitted that claims 1, 14 and 27 fully distinguish over the applied art and is thus are in condition for allowance. By virtue of dependence from what are believed to be allowable independent claims 1 and 14, it is respectfully submitted that claims 2-13 and 15-26 are also presently allowable.

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In summary, it is respectfully submitted that the instant application, including claims 1-27, is presently in condition for allowance. Notice to the effect is hereby earnestly solicited. In the unlikely event, however, it appears the claims will not be allowed, the Examiner is invited to call the undersigned to discuss the claims prior to the issuance of a further Office Action.

Respectfully submitted,



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